Electronically Filed July 7, 2008

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| Application of: Olsen et al. | Confirmation No.: | 1415 |
| Serial No. 09/855,633 | Art Unit: | 2164 |
| Filing Date: May 14, 2001 | Examiner: | Elda G. Milef |
| Title: METHODS FOR TRADE DECISION MAKING | Attorney Docket No: | 060967-0009-US |

# APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

(i) Real party in interest

The real party in interest is Olsen Data Ltd. of Zurich, Switzerland ("Olsen").

(ii) Related appeals and interferences

There are no related appeals and interferences.

(iii) Status of claims

Claims 10-14, 17-20 and 25-27 are the subject of this appeal. Claims 1-9, 16 and 21-24 have been withdrawn. Claim 15 has been canceled.

(iv) Status of amendments

No amendment was filed subsequent to final rejection.

(v) Summary of claimed subject matter

Applicants' invention is directed to a method of trading assets on a market. The method includes the steps of calculating trade recommendation information from each of a plurality of trading sub-models each of which is based on a different time of day and then calculating a trade recommendation on the basis of the trade recommendation information from each of the trading sub-models.

These steps are more fully described in the specification. At its most general level, as described in paragraph 0022 (page 4, line 24 of the specification), the preferred trading model comprises a set of indicator computations combined with a set of rules. The indicator computations analyze past price movements. The rules determine if an action is to be taken and its timing.

An example of an indicator is set forth in paragraph 0100 at equation 8 (page 16, line 28 of the specification). This indicator is defined as a momentum that is the difference of the current logarithmic middle price x and its moving average (MA) computed in v-time where v-time is a modified business time scale as described in paragraph 0095 (page 15, line 28 of the specification). Another example of an indicator is the value $I_\chi$ defined in equation 16 in paragraph 0116 (page 19, line 8 of the specification) which also is a momentum determined by a scaling factor and the difference between the current logarithmic middle price x and the exponential weighted moving average (EMA). Trading signals are given when the indicator crosses certain threshold values.

Examples of rules include a prohibition on any deal within 15 minutes of a prior deal as set forth in paragraph 0050 (page 9, line 27 of the specification) and a prohibition on a deal where price movements since the previous deal are too small as set forth in paragraph 0043 (page 8, line 28 of the specification).

Optimization of trading models is described at paragraphs 0123 through 0160 (page 20, line 10 to page 28, line 8 of the specification). An expression for an effective return $X_{eff,\,\Delta t}$ is set forth in equation 19 in paragraph 0128 (page 21, line 21 of the specification). As indicated, the effective return is a function of time $\Delta t$.

Various time functions are used in the different embodiments of the invention claimed in the present application. In the embodiment claimed in withdrawn claims 1-9 and described in

detail at paragraphs 0161 through 0184 (page 28, line 9 to page 31, line 28 of the specification), the time period is the time horizon of the trader. Some traders have short time horizons, other have long time horizons and others are in between. For example, Table 1 (before paragraph 0141, page 24, line 6 of the specification) sets forth results for time horizons ranging from 7 to 594 days; and paragraph 0246 (page 45, line 4 of the specification) refers to time horizons ranging from intra-day horizons to one month. In the invention claimed in claims 1-9, trade recommendation information is based on sub-models each of which is based on a different time horizon. A trading signal is developed as set forth in paragraph 0176 (page 30, line 17 of the specification) by summing the trading signals from all of the sub-models.

In the embodiment recited in claims 10-14, 17-20 and 25-27, which are the subject of this appeal, the sub-models are based on different times of the day. Basically, as set forth in paragraph 0191 (page 34, line 1 of the specification) it has been determined that, for best results, trading models should be based on 24 hour intervals and therefore are characterized by a specific hour of the day. However, as stated at paragraph 0207 (page 36, line 1 of the specification) this would result in a trading system that would make a trading recommendation once in every 24 hours. For example, it might give a recommendation at 10:00 A.M. on every trading day. To provide a trading system that can make trading recommendations more frequently, a series of sub-models are used each of which is updated at a different hour of the day and the recommendations of these models are combined, for example, by summing them as set forth in paragraphs 0207-0208 (page 36, lines 1 to 20 of the specification). Preferably, 24 such sub-models are used, one for each hour of the day, as indicated in paragraphs 0206-0208 (page 35, line 21 to page 36, line 20 of the specification).

(vi) Grounds of rejection to be reviewed on appeal

Claim 10 has been rejected under 35 U.S.C. 103(a) as unpatentable over Rickard (USP 6,016,483) in view of Kane (USP 6,317,728). Dependent claims 12-15 and 17 have been rejected for the same reason. Dependent claim 11 has been rejected under 35 U.S.C. 103(a) as unpatentable over Rickard, Kane and Wallman (USP 6,360,210). Dependent claims 18-20 have been rejected under 35 U.S.C. 103(a) as unpatentable over Rickard, Kane and Black (USP 6,012,042). Dependent claim 25 has been rejected under 35 U.S.C. 103(a) as unpatentable over Rickard, Kane and Stewart (USP 6,195,103); and dependent claims 26 and 27 have been rejected under 35 U.S.C. 103(a) over these references in view of Makivic (USP 6,061,662).

(vii) Argument

In contrast to applicants' invention, Rickard et al. disclose a system for an automated opening of an options exchange. As specified in Rickard's Abstract, market makers input into the system their current position, a desired target position and their orders. Public orders are also input. The system then allocates order imbalances at the opening of trading. The system is described as alleviating a cumbersome manual method for setting prices at the opening of trading.

As the Examiner acknowledges, Rickard does not calculate trade recommendation information using sub-models based on different times of the day. For this the Examiner relies on Kane which is a system for producing intra-day trading recommendations made by a plurality of agents 16. Intra-day means that "[i]f possible the system will end the day without holding any stock . . . but if it does, it will be short position." Col. 2, lines 6-8. Agents 16 are described at Col. 5, lines 4-10 as sections of computer logic that make buy or sell decisions based on buy and sell rules embedded in each agent. Half of the agents are long agents and half are short agents. Col. 5, lines 38 and 39. The agents are further described at Col. 5, lines 10 and 11 as representing different buy and sell rules; and Col. 3, lines 11 and 12 state that each agent operates in response to a dedicated one of the buy/sell rules. The logic is further described at Col. 7, lines 11 and 12 as evaluating "market and specific equity behaviors"; and examples of such evaluations are given at Col. 9, lines 45-54 as including a check on "directional tendency" of a stock, availability of a valid open price and availability of funds to purchase the stock.

Each security is evaluated by Kane's agents about once a minute as stated at Col. 9, lines 54-55. For each security, the recommendations of the long agents are tallied and the recommendations of the short agents are likewise tallied, Col. 9, lines 56-52. And the security having the greatest difference between long and short votes is selected for trading (Col. 9, lines 40-44). The process then repeats itself for the next minute and so on through the trading day.

A feature of Kane's system is a weighting system for weighting the votes of the agents in accordance with the success of their earlier recommendations. The success of investments is monitored and the agents who voted for and against these investments are tracked. Those agents that are more successful are rewarded by increasing the weight of their votes; and those that are less successful have their weights reduced or made negative. Col. 11, lines 20-34.

Kane's system, however, is not what applicants are claiming. As emphasized above, applicants' trading system uses sub-models based on different times of the day and the trade recommendation incorporates information from each of the sub-models. Kane does not use a plurality of models based on different times of the day and he does not combine the results of a plurality of such models in order to make his up-to-the-minute recommendation. Rather, Kane's agents make their buy/sell decisions for a multitude of securities once every minute or so and a recommendation is made to buy or sell the security having the greatest difference between the buy and sell votes that are cast.

Independent Claim 10

Claim 10 emphasizes these distinctions over Kane. In particular, claim 10 recites that trade recommendation information is calculated from each of a plurality of sub-models each of which is based on a different time of day. Further, claim 10 requires that the trade recommendation be calculated based on said information from each of the sub-models. Claim 10 is believed to be patentable over Rickard and Kane who do not disclose or suggest the use of a plurality of sub-models based on different times of the day. As noted above, the Examiner acknowledges that Rickard does not disclose the calculation of trade recommendation information using sub-models based on different times of the day and neither does Kane. Kane merely indicates that some of the factors considered by his agents include a check on "directional tendency" of a stock, availability of a valid open price and availability of funds to purchase the stock. None of these are models based on different times of the day and none of these suggest such models.

Further, Rickard and Kane do not suggest their combination. Rickard is directed to a specific problem: dealing with an automated opening of an options exchange and, in particular, the problem of balancing initial orders while accommodating market makers. Kane is directed to generating trading recommendations throughout the trading day at a rate of one a minute or so. While both patents relate to security exchanges, they relate to very different aspects of their operation: managing the opening process and generating trading recommendations; and there is no suggestion in Rickard that it might be modified as the Examiner suggests to include apparatus for generating trading recommendations throughout the trading day.

Dependent Claim 11

Dependent claim 11 is patentable for the same reason claim 10 is patentable and because it specifies the use of 24 sub-models based on different times of day. While Wallman may teach the use of various pricing models, like Kane he does not teach the use of models based on different times of the day.

Dependent Claims 12-14

Dependent claims 12-14 are patentable for the same reason claim 10 is patentable. In addition, these claims are patentable because neither Rickard nor Kane discloses or suggests the additional step of evaluating the performance of the sub-models using a risk-sensitive performance measure. As the Examiner acknowledges, Rickard does not calculate trade recommendation information using sub-models based on different times of the day. As a result, Rickard also does not evaluate the performance of such sub-models. While Rickard may discuss various factors that affect an option's price, that does not disclose or suggest the claimed step of evaluating the performance of sub-models using a risk-sensitive performance measure.

Dependent Claim 17

Dependent claim 17 is patentable for the same reason claim 10 is patentable and for the additional reason that Rickard does not disclose all the elements of the sub-model that are recited in claim 17. Of particular note, Rickard does not disclose a price filter or a gearing calculator. A price filter receives prices and filters them by rejecting those that are erroneous. The Examiner asserts that Rickard's controller 2 (Fig. 2) is a price filter but no such function is described for controller 2 at Col. 9, lines 3-21. Controller 2 is described at Col. 8, line 45 as a multi-gigaflop computer. As shown in Fig. 2, it receives public orders 102 and market maker orders 104 and outputs a set of prices but no price filtering function is described. Nor does Rickard disclose a gearing calculator. As stated by applicants in paragraph 0023 (page 5, line 5 of the specification), a gearing calculator determines how much capital exposure is to be allowed. While Rickard may determine a compromise point between implied volatilities, this does not disclose or suggest applicants' gearing calculator as claimed in claim 17.

Dependent Claim 18-20

Dependent claims 18-20 are patentable for the same reasons claim 10 is patentable. Further, claims 18-20 are believed patentable over the references because they do not suggest the claimed methods of summing weighted trade recommendations of the sub-models. As

emphasized above, each sub-model is based on a different time of day. None of the references cited discloses or suggests the use of a plurality of such models or the step of combining their recommendations by summing weighted trade recommendations.

As the Examiner concedes, Rickard and Kane do not disclose the summing of the weighted trade recommendations of the sub-models. For this, the Examiner relies on Black, citing Col. 10, lines 65-67. This reliance is misplaced. Black describes a security analysis system which combines technical data and fundamental data. The technical data is described in box 12 of FIG. 1 as historical time series security price and volume data. The fundamental data is described in box 16 as historical non-time series security fundamental data. The language at Col. 10, lines 65-67 on which the Examiner relies merely says that this data can be variably weighted. This, however, does not disclose or suggest the summing of weighted trade recommendations of the sub-models as recited in claims 18-20 or the specific weighting formulae recited in claims 19 and 20.

Dependent Claims 25-27

Dependent claims 25-27 are patentable for the same reason claim 10 is patentable and because they require each sub-model to be based on a triplet comprising price change and volatility data at regular intervals of a basic grid interval. Dependent claims 26 and 27 are believed patentable over Rickard, Kane, Stewart and Makivic because they recite specific details of the measurement of volatility not disclosed in these references.

For the foregoing reasons, claims 10-14, 17-20 and 25-27 are believed to be patentable over the references cited.

Respectfully submitted,

Date: July 7, 2008

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(viii) Claims Appendix

10. A method of trading assets on a market, comprising the steps of:

(a) receiving price data for an asset over one or more computer networks;

(b) receiving current system position information;

(c) storing said received asset price data and said current system position information in a computer-readable medium;

(d) calculating trade recommendation information from each of a plurality of trading sub-models; wherein each sub-model is based on a different time of day, said calculation based on said received asset price data;

(e) calculating a trade recommendation regarding said asset based on said trade recommendation information from each of said trading sub-models.

11. A method as in claim 10, wherein 24 sub-models are used.

12. A method as in claim 10, further comprising the step of evaluating the performance of said sub-models using a risk-sensitive performance measure.

13. A method as in claim 12, wherein said risk-sensitive performance measure is used to optimize the performance of the trading models.

14. A method as in claim 12, wherein said risk-sensitive performance measure is an effective return.

17. A method as in claim 10, wherein each sub-model comprises:

(a) a price collector component;

(b) a price filter component;

(c) a price database component;

(d) a gearing calculator component;

(e) a deal acceptor component; and

(f) a book-keeper component.

18. A method as in claim 10, wherein the step of calculating a trade recommendation regarding said asset based on said trade recommendation information from each of said trading sub-models is performed by summing weighted trade recommendations of the sub-models.

19. A method as in claim 10, wherein the step of calculating a trade recommendation regarding said asset based on said trade recommendation information from each of said trading

sub-models is performed by summing weighted trade recommendations of $N$ sub-models within the last $T$ hours, where $N$ and $T$ are positive integers.

20. A method as in claim 10, wherein the step of calculating a trade recommendation regarding said asset based on said trade recommendation information from each of said trading sub-models is based on a ratio obtained by summing weighted trade recommendations of $N$ sub-models within the last $T$ hours, where $N$ and $T$ are positive integers and dividing that sum by the total number of sub-models.

25. A method as in claim 10, wherein each sub-model is based on a triplet comprising price change and volatility data calculated at regular intervals of a basic grid interval.

26. A method as in claim 25, wherein the volatility is measured as a mean of absolute log price change.

27. A method as in claim 26, wherein the mean is taken over the last $M$ consecutive observations of log price change over the basic grid interval, where $M$ is a positive integer.

(ix) Evidence Appendix

None

(x) Related Proceedings Appendix

None